

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
TYLER DIVISION

DAVIS-LYNCH, INC.,

PLAINTIFF,

v.

WEATHERFORD INTERNATIONAL, INC.,

DEFENDANT.

CIVIL ACTION NO. 6:07-CV-559-JDL

JURY REQUESTED

REBUTTAL EXPERT REPORT OF DR. WILLIAM W. FLECKENSTEIN

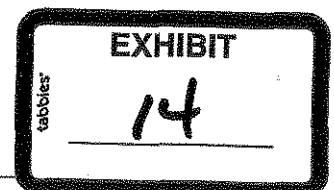
I have reviewed the expert report of Mr. Gary R. Wooley submitted by Plaintiff Davis-Lynch, Inc. ("Davis-Lynch") regarding Weatherford International, Inc.'s ("Weatherford") alleged infringement of U.S. Patent No. 6,679,336 ("the '336 patent"). In response to Mr. Wooley's report, I offer the following analysis, discussion, and opinions:

I. Background And Qualifications/Publications/Previous Testimony/Compensation

1. My background and qualifications, the publications I have authored, and my compensation for acting as an expert witness in this litigation are set forth in my expert report, and attachments thereto, submitted on May 27, 2009, and are incorporated by reference into this rebuttal report.

II. Materials And Information Considered In Forming Opinions

2. In arriving at the opinions expressed in this rebuttal report, I reviewed and considered the materials listed in Exhibit A attached to this rebuttal report and the materials listed in Exhibit D attached to my expert report submitted on May 27, 2009.



III. Weatherford's Alleged Infringement Of The '336 Patent

3. For at least the reasons explained below, I disagree with Mr. Wooley's opinion that Weatherford's accused products infringe the '336 patent.

A. The Law Of Infringement

4. I have been informed that the law considers the question of noninfringement to be a question of fact, and that to evaluate noninfringement, one applies the asserted claims, as construed by the court, to each accused device. I have also been informed that, under the law, if an accused device lacks one or more elements of an asserted patent claim, either literally or by equivalents, the accused device does not infringe the asserted patent claim.

5. I have been informed that literal infringement only exists if each of the claim limitations are found in the accused device. I have also been informed that infringement under the doctrine of equivalents exists if the differences between the claimed limitation and the corresponding element of the accused product are insubstantial. My understanding is that the most common way to analyze this standard is by determining whether the corresponding element of the accused product performs substantially the same function in substantially the same way to obtain substantially the same result as the claimed limitation.

B. Weatherford's Accused Products Do Not Contain Flapper Valves That Close In Response To Fluid Flow Direction, As Required By Asserted Claims 33, 34, 35, 37, And 51

6. It is my understanding that the scope of a patented invention is defined by the claims of the patent. Here, asserted claim 33 of the '336 patent includes the following limitations: a "first flapper closure element being pivotally moveable between said open position and said closed position *responsively to fluid flow direction*" and a "second flapper closure element being pivotally moveable between said open position and said closed position

responsively to fluid flow direction.” (emphasis added). It is my understanding that, because claims 34, 35, and 37 depend from claim 33, they also include these limitations.

7. I am informed that the Court determines, as a matter of law, the proper meaning, or construction of disputed claim terms. Accordingly, I have reviewed the Court’s April 20, 2009 claim construction Memorandum Opinion and Order (“the claim construction order”). In light of the claim construction order, as well as agreed definitions, it is my understanding that the relevant claim terms of claim 33, as quoted above, have the following meanings:

- (a) **“flapper closure element”** – no construction necessary
- (b) **“pivotally moveable”** – movable on, or as if on, a pivot
- (c) **“open position”** – plain language meaning; no need for construction
- (d) **“closed position”** – plain language meaning; no need for construction
- (e) **“responsively to fluid flow direction”** – In response to the direction of fluid flow

8. Based on these claim term definitions, I have compared the language of asserted claims 33, 34, 35, and 37 of the ‘336 patent (as construed by the Court) to Weatherford’s accused product models L42A, L45AP, and L46AP. My comparison was performed with the understanding that Davis-Lynch is contending that Weatherford’s accused products literally infringe these elements of the ‘336 patent. *See* Davis-Lynch’s Third Supplemental Disclosure of Asserted Claims and Patent Infringement Contentions. As explained below, it is my opinion that none of Weatherford’s accused product models (L42A, L45AP, and L46AP) include each and every limitation of claims 33, 34, 35, and 37 of the ‘336 patent.

9. Specifically, none of Weatherford’s accused products have a first or second flapper closure element that moves to the closed position “responsively to fluid flow direction.” Rather, the flappers in each of Weatherford’s accused products are closed by a spring.

10. In fact, and as explained in detail in Exhibit B, the only forces acting to close the flapper valves on Weatherford's accused products are the springs. This is because at the end of a cement job a solid cementing plug is pumped down from the surface until it bumps the float collar. The plug is not able to move further downward once it bumps the float collar. Once the plug bumps, it effectively prevents flow in either direction above or below the plug until the surface pressure is bled off. At this moment, the downwardly directed fluid flow associated with pumping from the surface ceases and there is no pressure differential across the flapper valves. Up until this point, the downwardly directed fluid flow caused the flappers to remain in the open position. However, when the fluid flow stops after the cementing plug bumps, the only force acting upon each of the flappers is a spring, biased toward the closed position.

11. Thus, the flapper valves on Weatherford's accused products do not close in response to the direction of fluid flow, as claim 33 requires. Rather, Weatherford's flappers close solely due to the force of a spring, which occurs when fluid flow across the flappers has stopped. As Weatherford's accused products do not include this limitation, they do not infringe claims 33, 34, 35, and 37.

12. Similarly, cancelled claim 43 of the '336 patent, from which asserted claim 51 depends from, includes the following limitation: "Removing said inner tubular from said plurality of flapper valves such that said flapper valves are pivotal to thereby open in response to a direction of fluid flow away from said surface position and to *close in response to a direction of fluid flow* towards said surface position." (emphasis added).

13. For the same reasons explained in paragraphs 8-11 above, Weatherford's accused products contain flapper valves that close from the force of a spring, not in response to fluid flow

direction. Accordingly, Weatherford's accused products do not include this limitation, and thus do not infringe claim 51 of the '336 patent.

14. I note that Mr. Wooley's expert report fails to identify how Weatherford's accused tools satisfy these claim limitations regarding flappers that close in response to fluid flow direction. Without providing any justification or empirical basis, Mr. Wooley states that the flapper valves on Weatherford's model L42A float collar "pivot to the closed position when fluid attempts to flow up." Wooley Report at pg. 16.¹ However, Mr. Wooley's statement omits any explanation as to how fluid flow direction causes the flapper valves on Weatherford's model L42A float collar to close.

15. In fact, Mr. Wooley's statement actually supports my opinion that springs, not a response to fluid flow direction, cause Weatherford's flapper valves to close. Mr. Wooley stated that the flappers pivot closed when fluid "attempts" to flow up. Mr. Wooley's use of the word "attempts" implies that fluid flow is not flowing upwards when the flapper valves pivot closed, due to the balance of pressure forces prior to bleeding the surface pressure off. Thus, Mr. Wooley's statement is consistent with my opinion that the springs close the flapper valves at the moment fluid flow has stopped.

16. I also note that Davis-Lynch's infringement contentions state that a spring assists with closing the flapper valves, and that "the pressure of the spring is minimal when compared to the back pressure of the cement." See Davis-Lynch's Third Supplemental Disclosure of Asserted Claims and Patent Infringement Contentions at Exhibits A-D. Although Mr. Wooley's report is silent on this point, Davis-Lynch's attempt to identify so-called "spring pressure" as providing minimal assistance is both factually inaccurate and inconsistent with the claim language.

¹ Mr. Wooley also stated that the other Weatherford accused models contain flapper valves that close in this same manner.

17. First, and as explained above, the springs provide the entire force necessary to close the flapper valves. The flappers do not close in response to fluid flow direction, as the pressures at the float valve are in static equilibrium and there is no differential pressure across the flappers when the springs close them. Thus, Davis-Lynch's attempt to characterize the involvement of springs as "minimal" is factually incorrect.

18. Second, the relevant claim language refers to closure in response to fluid flow direction, not closure due to fluid pressure. While other claims in the '336 patent specifically refer to fluid pressure, this limitation refers to a response to fluid flow direction. Thus, Davis-Lynch's attempt in its infringement contentions to equate the pressure of springs and the back pressure of cement as being the same as fluid flow direction is improper.

C. Weatherford's Accused Products Do Not Contain An Outer Tubular Affixed To The Tubular String, As Required By Asserted Claims 33, 34, 35, and 37

19. Asserted claim 33 of the '336 patent contains the following limitation: "an outer tubular affixed to said tubular string." Further, it is my understanding that, because claims 34, 35, and 37 depend from claim 33, they also include this limitation.

20. In light of the claim construction order, as well as agreed definitions, it is my understanding that the relevant claim terms of claim 33, as quoted above, have the following meanings:

- (a) **"outer tubular"** – An outer part or component, of tool 14, that is shaped like a tube
- (b) **"affixed to said tubular string"** – No construction necessary, subject to the following findings of the Court in the claim construction order:
 - i. "There is no support for Davis-Lynch's contention that the claims at issue cover an embodiment where the outer tubular forms a portion of the tubular string." Order at pg. 11.

- ii. Asserted claim 33, recites “an outer tubular affixed to said tubular string,” which “clearly describes the ‘outer tubular’ and ‘tubular string’ as two separate components.” Order at pg. 10.
- iii. Davis-Lynch’s interpretation – that “the outer tubular may be indirectly ‘affixed’ to the tubular string if it is glued to a section of pipe that is threaded into the tubular string, and the outer tubular may be directly ‘affixed’ to the tubular string if the outer tubular is a section of pipe threaded directly into the tubular string” – “find [] no support in the intrinsic evidence.” Order at pg. 10.
- iv. Based on usage of the term in the patent specification, “the word ‘affixed’ describes the mounting of one tubular member inside another tubular member, rather than the threading together of sections of pipe.” Order at pg. 11.

(c) **“tubular string”** – A length of pipe run into a wellbore that is composed of smaller sections of pipe threaded together

21. Based on these claim term definitions, I have compared the language of asserted claims 33, 34, 35, and 37 of the ‘336 patent (as construed by the Court) to Weatherford’s accused product models L42A, L45AP, and L46AP. My comparison was performed with the understanding that Davis-Lynch is contending that Weatherford’s accused products infringe this limitation of the ‘336 patent by the doctrine of equivalents. *See* Davis-Lynch’s Third Supplemental Disclosure of Asserted Claims and Patent Infringement Contentions. As explained below, it is my opinion that none of Weatherford’s accused product models (L42A, L45AP, and L46AP) include each and every limitation of claims 33, 34, 35, and 37 of the ‘336 patent.

22. Specifically, none of Weatherford’s accused products have an outer tubular that is affixed to the tubular string. In fact, the outer tubulars in Weatherford’s accused products do not make any contact or connection with a tubular string. Rather, and as shown in Exhibit C, the outer tubulars (shown in red) in each of Weatherford’s accused products are enclosed in cement within the outer shell. Only this outer shell (shown in green) is then capable of being affixed to the tubular string.

23. I note that Mr. Wooley's expert report identifies the wrong component, as defined in the Court's claim construction order, as the "outer tubular" each time this component is labeled in a figure. *See, e.g.*, Wooley Expert Report at pgs. 7-8, 16-19. The flaw in Mr. Wooley's identification of the outer tubular appears to stem from his disregard for the claim construction order. Specifically, the Court construed "outer tubular" to be an outer component of *tool 14* that is shaped like a tube. The Court's reference to "tool 14" is clearly limited to the valve assembly, as depicted, for example, in Figure 3 of the '336 patent. Because the Court's claim construction order required the outer tubular to be a component of "tool 14," it necessarily excluded the possibility that the outer tubular could be a component that is external to tool 14. However, Mr. Wooley's expert report ignores this aspect of the claim construction order as he incorrectly identified the outer shell (i.e., the tubular shell in which "tool 14" is cemented within) as the "outer tubular" (or "outer tube") in every figure contained in his report. Mr. Wooley's identification is inconsistent with the claim construction order, including the Court's finding that (a) the outer tubular may be drilled out, and (b) each figure in the '336 patent identifies the outer tubular as a component separate from the tubular string. *See* Claim Construction Order at pgs. 9-10.

24. I also note that Davis-Lynch has asserted that this element is present in Weatherford's accused products under the doctrine of equivalents. *See* Davis-Lynch's Third Supplemental Disclosure of Asserted Claims and Patent Infringement Contentions. While Mr. Wooley's expert report is silent regarding this contention, the '336 patent specification describes an example of how "tool 14" (including the outer tubular) may be cemented or otherwise mounted within a pipe. '336 Patent at 7:4-6. In this example, the pipe, with tool 14 mounted therein, may be attached to the casing/liner string and run into the wellbore. *Id.* at 7:22-24.

Thus, in this example, the pipe (not the outer tubular) is affixed to the tubular string. Moreover, I have been informed that the doctrine of equivalents does not apply to subject matter that is disclosed in the specification but not claimed, as such subject matter has been dedicated to the public. Accordingly, Weatherford's accused products, which lack an outer tubular affixed to the tubular string – just as the example described in the unclaimed specification excerpts cited above – do not infringe this element of claim 33 under the doctrine of equivalents. Thus, Weatherford's accused products do not infringe claims 33, 34, 35, and 37 of the '336 patent.

25. Moreover, I disagree with Davis-Lynch's contention that the "function" of the outer tubular is to connect to the tubular string. *See* Davis-Lynch's Third Supplemental Disclosure of Asserted Claims and Patent Infringement Contentions at Exs. A-D. Rather, the function of the outer tubulars of Weatherford's accused products is to provide a structure to mount the flapper valves. *See, e.g.*, Exhibit C. The flapper valves are maintained in recesses formed by the outer tubulars and inner tubulars. *Id.* The valve assemblies of Weatherford's accused products are cemented to the outer shell. *Id.* The outer shell is threaded for attachment to the tubular string. Thus, one of the functions of the shell, as opposed to the outer tubulars, is to provide the mechanism for connection to the tubular string. The valve assembly may be subsequently drilled out, while the shell remains part of the casing string. This is a substantially different way than to connect the outer tubulars directly to the tubular string.

26. Claim 33 also requires that a first flapper valve body and a second flapper valve body be mounted within the outer tubular. This appears to cover the embodiments illustrated in Figures 6-9 of the '336 patent. By mounting the first and second flapper valve bodies between the outer tubular and inner tubular, Davis-Lynch can completely protect the valves and valve seats from cuttings, abrasive fluids, and the damage caused by flow of such materials.

Weatherford's L42A, L45AP, and L46AP models do not have a single "outer tubular" in which both a first flapper valve body and a second flapper valve body are mounted within, as required by claim 33. Instead, and as illustrated in Exhibit C, each flapper valve body is mounted within a separate "outer tubular" (shown in red), albeit that the lower "outer tubular" only covers a portion of the lower flapper closure element.

27. Mr. Wooley's report does not indicate whether he considers Weatherford's tool to satisfy the limitations discussed in paragraph 26 under the doctrine of equivalents. Regardless, as indicated above, it is my understanding that the doctrine of equivalents does not apply to subject matter that is disclosed in the specification but not claimed, as such subject matter has been dedicated to the public. Figures 2-5 of the '336 patent illustrate an embodiment wherein the first flapper valve body is mounted within one outer tubular 25 and the second flapper valve body is mounted within a second outer tubular 25. Thus, Davis-Lynch dedicated to the public float equipment having a separate outer tubular for each valve body.

D. Weatherford's Accused Products Do Not Contain Flapper Valves That Are Completely Sealed Off And Protected From Damage, As Required By Asserted Claims 33, 34, 35, 37, and 51

28. Asserted claim 33 of the '336 patent contains the following limitation: "said inner tubular being mounted to extend simultaneously through both said first bore and said second bore to thereby secure said first flapper closure element in said open position for operation in said auto-fill mode and to secure said second flapper closure element in said open position for operation in said auto-fill mode." Further, it is my understanding that, because claims 34, 35, and 37 depend from claim 33, they also include this limitation. Similarly, cancelled claim 43 of the '336 patent contains the following limitation: "covering said bore of said plurality of flapper valves by extending an inner tubular through all of said plurality of

flapper valves.” It is also my understanding that because asserted claim 51 depends from canceled claim 43, it also includes this limitation.

29. In light of the claim construction order, and the Court’s order denying the parties’ Motions for Reconsideration, it is my understanding that the Court found no construction necessary for these elements of claims 33 and 51, but stated that “protection of the seal areas from damage by cuttings or abrasive fluids is a feature of the invention as a whole.” Order Denying Motions for Reconsideration at 3. The court stated, however, that “there is no need to explicitly include this limitation in the construction of the claim terms at issue because the claim language itself encompasses the limitation.” *Id.* at 4. The Court also cited to an embodiment in the patent “which protects the flapper valves by securing them between the inner tubular and outer tubular of tool 14. Claim 33 recites flapper valves mounted to an outer tubular and secured by an inner tubular.” *Id.* From my review of the Court’s orders and Davis-Lynch’s statements made during prosecution of the ‘336 patent, these claim elements are limited to flapper valves that are completely protected from cuttings and/or abrasive fluids. *Id.*, *see also, e.g.*, ‘336 Patent Petition to Make Special at 10-11.

30. I have compared this language of claims 33 and 43 of the ‘336 patent and the Court’s statements to Weatherford’s accused product models L42A, L45AP, and L46AP. As explained below, it is my opinion that none of Weatherford’s accused product models (L42A, L45AP, and L46AP) include each and every limitation of claims 33, 34, 35, 37, and 51 of the ‘336 patent.

31. Specifically, none of Weatherford’s accused products have a lower flapper valve or valve seat that is completely sealed off and protected from damage by cuttings or abrasive fluids, as required by the Court’s order and Davis-Lynch’s statements during prosecution of the

'336 patent. *See* Court's Order denying Motions for Reconsideration; *see also* '336 Patent Petition to Make Special at 10-11. Nor do Weatherford's accused products contain a lower flapper valve or valve seat that are secured and protected from damage as illustrated and claimed in the '336 patent according to the Court's findings. Rather, the lower flapper valves and valve seats on Weatherford's accused products are exposed to the flow of cuttings or abrasive fluids, which can cause damage that Davis-Lynch sought to prevent, as indicated in its Petition to Make Special.

32. Furthermore, Weatherford's accused model L45AP is flow activated, containing two flow ports that are positioned adjacent to the lower flapper valve and below the valve seat. *See* WDE 0022029. These flow ports allow additional flow of cuttings or abrasive fluids to come into contact with the lower flapper valve and valve seat, contrary to the required limitations in claims 33 and 43 that these elements be protected from such damage.

33. I note that Mr. Wooley's expert report completely omits any discussion regarding the alleged infringement by Weatherford's accused products in light of these limitations.

E. Weatherford's Accused Products Have Not Been Operated With A Second Fluid Pressure-Operated Tool, As Required By Asserted Claim 37

34. I note that Mr. Wooley identifies the "pressure operated tool" of claim 37 as a liner hanger but provides no further details. *See* Wooley Report at 23. I have reviewed Davis-Lynch's Third Supplemental Disclosure of Asserted Claims and Patent Infringement Contentions and the evidence cited in support of their infringement contentions with respect to claim 37. None of the evidence cited supports Davis-Lynch's contentions or Mr. Wooley's opinion that Weatherford has used or is using a hydraulically actuated liner hanger with the accused products, and more particularly, are setting a hydraulically (*i.e.*, pressure) actuated liner hanger with the same conversion ball used to activate the accused float equipment.

35. Specifically, the first document Davis-Lynch cites in its infringement contentions (WDE 0121400) discloses an "autofill float collar" that is different from the accused products. The float collar disclosed in this figure appears to contain a plunger assembly, not a flapper valve assembly. Thus, this document does not disclose the use of a hydraulically set liner hanger with Weatherford's accused products.

36. Additionally, the second document Davis-Lynch cites in its infringement contentions (WDE 010287) identifies a "L45 float collar" below a "hanger." The vague identification of a "hanger" in this document does not specify whether it is a hydraulically activated liner hanger. Moreover, the "hanger" identified in this document is located at a subsea wellhead and appears to contain a shoulder-to-shoulder connection, indicating that it is not hydraulically (*i.e.*, pressure) activated. Thus, this document also does not disclose the use of a hydraulically set liner hanger with Weatherford's accused products.

37. The last document Davis-Lynch cites in its infringement contentions (WD 014613) identifies a case history report dated July 2002, approximately 18 months prior to the issuance of the '336 patent. Thus, regardless of the disclosures in this document, my understanding is that it cannot be used to establish Weatherford's alleged infringement of claim 37 because the '336 patent had not yet issued when the job referenced on this document occurred.

38. Accordingly, I am not aware of any evidence supporting Mr. Wooley's opinion or Davis-Lynch's contention that Weatherford has infringed claim 37 of the '336 patent.

IV. Davis-Lynch's Alleged Damages

39. I am in agreement with Mr. Wooley's statement that quantifying the amount of Davis-Lynch's alleged damages is beyond the scope of his, and my, report and is being

addressed by others. However, I disagree with Mr. Wooley's other statements regarding a reasonable royalty and Davis-Lynch's prior art products.

40. For example, Mr. Wooley states that the alternatives for a down hole tool such as the Davis-Lynch patented float equipment are "more limited" than those related to the Weatherford-Varco license. Wooley Report at pg. 25. However, Mr. Wooley provides no examples regarding what these alternatives are and does not quantify these alternatives as compared to the pipe running alternatives referred to with the Weatherford-Varco license.

41. Further, Mr. Wooley ignores the fact that Weatherford's other large bore and mid bore auto-fill float equipment models constitute acceptable non-infringing alternatives. While I am aware of dozens of such models, examples would include Weatherford's models L42W0, L42WA, L45WP, and L46WP, which operate essentially the same as accused models L42A0, L42AA, L45AP, and L46AP, respectively. The only relevant difference in these alternative models from the accused models is their substitution of composite material for aluminum material. These models, in addition to the numerous other models in Weatherford's large bore and mid bore product lines, are available alternatives that could be used in lieu of the accused models and still provide the same benefits alleged by Davis-Lynch, such as reduction of surge pressure and debris tolerance.

42. Moreover, even Weatherford's and Halliburton's prior art float equipment containing dual inner tubulars would constitute acceptable non-infringing alternatives. *See, e.g.*, WDE 0772060-63; Depo. Tran. of Corporate Representative of Davis-Lynch at 153:5-156:2; 164:15-165:14. These prior art tools operate essentially the same as the tool claimed in the '336 patent and offer surge reduction and a degree of debris tolerance that would be acceptable to customers. I note that this point is strengthened by Mr. Wooley's statement that Davis-Lynch's

patented products offer improved reliability and protection of flappers over Davis-Lynch's prior art Type 505A-DV float shoe. *See* Wooley Report at pg. 26. Mr. Wooley states that this improved reliability and protection is caused by the addition of an inner tubular, a feature that is absent from Davis-Lynch's Type 505A-DV float shoe. However, both Weatherford's and Halliburton's prior art tools contain inner tubulars, and thus offer the same benefits Mr. Wooley attributes to Davis-Lynch's patented product.


43. Additionally, Mr. Wooley ignores the fact that at least the Baker prior art references cited in my May 27, 2009 expert report constitute acceptable non-infringing alternatives. *See, e.g.*, WDE 0023736-41; WDE 0023744-46. These prior art float shoes operate essentially the same as the tool claimed in the '336 patent and could easily be modified from a float shoe to a float collar. Further, these prior art tools offer the same alleged benefits of surge reduction and debris tolerance that Mr. Wooley claims are present in the tool claimed in the '336 patent.

44. I also note that in a liner application, a diverter tool in the running string has a far greater impact on the reduction of surge pressure than float equipment, such as the accused products or the patented products. This is accomplished by "diverting" the displaced wellbore fluid from flowing up the smaller-diameter drill string, but instead partially flowing a greater volume of displaced wellbore fluid up the larger diameter annulus outside the drill string, above the liner. This is consistent with the testimony of Mr. Jerry Allamon on this same point. *See* Allamon Depo. Tran. at 117:14-120:7.

45. Further, the purported benefit of surge pressure reduction in Davis-Lynch's patented products, through the use of an internal bore diameter greater than two inches, is overstated. Surge pressure reduction decreases dramatically once the bore diameter through the

float equipment exceeds approximately 1.5 inches. This conclusion is supported by industry literature, such as the World Oil reference (Exhibit F of my May 27, 2009 expert report) and the Burkhardt reference (Exhibit E of my May 27, 2009 expert report), as well as my own separate calculations, as set forth in more detail in Exhibit D.

Dated: June 8, 2009

A handwritten signature in black ink, appearing to read "William W. Fleckenstein". The signature is fluid and cursive, with a long horizontal stroke at the end.

Dr. William W. Fleckenstein